Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A SODAR method of detecting and/or quantifying short-duration near-ground target turbulence in a volume of air comprising the steps of:

transmitting a first acoustic chirp into said volume when or where the target turbulence is absent,

detecting echoes of said first chirp to thereby generate a reference dataset indicative of prevailing ambient conditions in said volume of air,

transmitting a second acoustic chirp into said volume when or where the target turbulence is present,

detecting echoes of said second chirp to thereby generate an active dataset indicative both of said prevailing ambient conditions and of said target turbulence, and

differencing said reference and said active datasets to generate a net dataset indicative of the target turbulence with the effect of said prevailing conditions reduced.

2. (Currently amended) A SODAR method according to claim 1 including the steps of:

transmitting each of said first and second acoustic chirps for [[a]] substantially identical durations of between 300 ms and 3 s,

employing matched filter techniques to extract phase and amplitude data arising from acoustic echoes of the first chirp returned from said air volume during a first listening time, which comprises substantially the duration of the respective chirp and an additional contiguous period that is shorter than the duration of the respective chirp, to thereby generate said reference dataset,

employing matched filter techniques to extract phase and amplitude data arising from acoustic echoes of the second chirp returned from said air volume during a second listening time, which is of substantially the same duration as the first listening time, to thereby generate said active dataset, and

visually plotting or tabulating the net dataset, or selecting portions thereof, with respect to said second listening time to depict or represent the target turbulence.

3. (Original) A SODAR method according to claim 2 wherein an acoustic transmitter is employed to generate said second chirp and plurality of acoustic receivers are arranged equidistant around the transmitter, each receiver is arranged to receive and detect echoes from each second chirp transmitted by the transmitter, and said matched filter techniques are used to extract phase and amplitude data from echo signals received by each receiver, the method including the step of differencing the phase and amplitude data extracted from the plurality of receivers so as to indicate the horizontal and/or vertical movement of the target turbulence within the volume of air.

4. (Original) A SODAR method of detecting and/or quantifying short-duration near-ground target turbulence in a volume of air comprising the steps of:

transmitting a first acoustic chirp having a duration of between 300 ms and 3 s into said volume,

employing matched filter techniques to extract phase and amplitude data arising from acoustic echoes of said first chirp returned from said air volume during a first listening time comprising transmission of said first chirp plus a contiguous period of time thereafter that is shorter than the duration of the chirp, said extracted phase and amplitude data forming an active dataset indicative of both the target disturbance and prevailing ambient conditions within the volume of air, and

plotting or tabulating the variation of said active dataset with respect to said listening time to depict or represent such turbulence.

5. (Original) A SODAR method according to claim 4 including the steps of:

transmitting a second acoustic chirp that is substantially identical to the first acoustic chirp into said volume when or where the target turbulence is absent,

employing matched filter techniques to extract phase and amplitude data arising from acoustic echoes of said second chirp returned from said air volume during a second

listening time, which is of substantially the same duration as the first listening time, to thereby generate a reference dataset indicative of the prevailing ambient conditions alone, and

differencing said reference and said active datasets to generate a net dataset indicative of the target turbulence with the effect of said prevailing conditions reduced.

6. (Original) A SODAR method according to claim 5 wherein an acoustic transmitter is employed to generate said first chirp and a plurality of acoustic receivers are arranged equidistant around the transmitter, each receiver is arranged to receive and detect echoes from each second chirp transmitted by the transmitter, and said matched filter techniques are used to extract phase and amplitude data from echo signals received by each receiver, the method including the step of differencing the phase and amplitude data extracted from the plurality of receivers so as to indicate the horizontal and/or vertical movement of the target turbulence within the volume of air.

7. (Currently amended) A SODAR method according to claim 2 [[or 5]] wherein four receivers are arranged in quadrature around the transmitter and equally spaced therefrom, a first pair of receivers being arranged on a first axis passing through the transmitter and a second pair of receivers being arranged on a second axis passing through the transmitter, the method including the steps of:

differencing the phase outputs extracted from the first pair of receivers to derive a first velocity dataset indicative of the speed of movement of the target turbulence along said first axis, and

differencing the phase outputs extracted from the second pair of receivers to derive a second velocity dataset indicative of the speed of movement of the target turbulence along said second axis.

8. (Original) A SODAR method according to claim 7 including the step of combining the first and second velocity datasets to generate a bearing dataset indicative of the azimuth bearing of the movement of the target turbulence with respect to the transmitter.

9. (Currently amended) A SODAR method according to ~~any preceding claim~~ <u>claim 1</u> wherein the volume of air is near an airport runway, landing approach or takeoff path and between the

ground and an altitude of 300 m, wherein the target turbulence is wake vortices shed by large aircraft and wherein the chirp or chirps are transmitted substantially vertically.

10. (Original) A SODAR method of detecting and/or quantifying short-duration near-ground target turbulence in a volume of air in an airport landing approach or takeoff path below an altitude of 300 m, the method comprising the steps of:

transmitting a first acoustic chirp upwardly at an acute angle of elevation by a transmitter located on one side of the path in order to acoustically illuminate a target turbulence along with prevailing wind conditions in the volume of air,

detecting acoustic echoes of the chirp returned from the volume of air by each of a plurality of receivers spaced apart across the path,

extracting a first set of phase and/or amplitude data from each receiver using matched filter techniques that reference the waveform of the transmitter chirp, and

employing the first set of extracted data to generale an active synthetic-aperture dataset indicative of the combined prevailing wind conditions and the target turbulence within the air volume.

11. (Currently amended) A SODAR method according to claim 10 including the steps of:

in the absence of the target turbulence but with the presence of said prevailing wind conditions, transmitting a second acoustic chirp that is substantially identical to said first chirp upwardly at said acute angle of elevation in order to acoustically illuminate the volume of air,

detecting acoustic echoes of said second chirp returned from the volume of air by each of a plurality of said receivers,

extracting a second set of phase and/or amplitude data from each receiver using matched filter techniques that reference the waveform of the transmitter chirp, [[and]]

employing said second set of extracted data to generate a reference synthetic-aperture dataset indicative of the prevailing wind conditions within the air volume, and

differencing the extracted first and second sets of phase and/or amplitude data to, or differencing said active and reference synthetic-aperture datasets to indicate the target turbulence with the prevailing wind conditions absent or attenuated.

12. (Currently amended) A SODAR method according to claim 3 [[or 6]] including the steps of:

separately differencing the phase and amplitude components of the active and reference datasets to generate separate net phase dataset and a separate amplitude net dataset.

13. (Original) A SODAR system according to claim 12 including the steps of:

differentiating, or determining the gradient, of the net phase dataset to accentuate the presence of vortex-like target turbulences having closely spaced but opposite wind speeds.

14. (Original) A SODAR system for use in detecting and/or quantifying short-duration near-ground target turbulence in a volume of air, the system comprising:

acoustic transmitter means adapted to direct acoustic chirps into said volume to generate a first set of chirp echoes from prevailing wind conditions and from target turbulence within said volume and a second set of substantially identical acoustic chirps into the volume to generate a second set of chirp echoes from the prevailing wind conditions in the absence of the target turbulence,

acoustic receiver means located to receive said first and second series of echoes and to generate an active dataset indicative of said prevailing conditions and turbulence and a reference dataset indicative of the prevailing conditions alone,

differencing means adapted to difference said active and reference datasets to generate a net dataset that is representative of the target turbulence without the prevailing wind conditions, or at least with the effect of such conditions mitigated.

15. (Original) A SODAR system according to claim 14 wherein:

said transmitter means is adapted to generate chirps having durations between 300 ms and 3 s,

a matched filter is arranged to receive output from said receiver means and to extract phase and/or amplitude data therefrom, said active and said reference datasets including such phase and/or amplitude information, and

said differencing means being arranged to receive said active and reference data sets and to separately difference the amplitude components and the phase components thereof to generate said net dataset.

16. (Currently amended) A SODAR system according to claim 14 [[or 15]] wherein:

said transmitter means comprises a first transmitter and a second transmitter spaced sufficiently apart so that a single target turbulence will not be illuminated by chirps transmitted by both transmitters but sufficiently close that the prevailing wind conditions will be common,

said receiver means comprises a first receiver assembly located near the first transmitter for receiving said first series of echoes from chirps, which are transmitted by said first transmitter, the active dataset being generated from the output of the first receiver assembly,

said receiver means also comprises a second receiver assembly near the second transmitter for receiving said second series of echoes, which are transmitted by said second transmitter, the second dataset being generated from the output of the second receiver assembly.

17. (Currently amended) A SODAR system according to claim 16 wherein:

said first receiver assembly comprises four individual first receivers located equidistant and in quadrature around the first transmitter to form two pairs of opposed first receivers,

each of said first receivers outputs to an active matched filter adapted to extract phase data in the echoes received by the respective first receiver,

first differencing means are connected to said active matched filters and adapted to difference phase data extracted thereby to generated differenced phase data indicative of the bearing and horizontal velocity of air movement within the air volume illuminated by the chirps of the first transmitter,

said second receiver assembly comprises four individual second receivers located equidistant an din quadrature around the second transmitter to form two pairs of opposed second receivers,

each of said second receivers outputs to a reference matched filter adapted to extract phase data in the echoes received by the respective second receiver, <u>and</u>

second differencing means are connected to said reference matched filters and adapted to difference phase data extracted thereby to generate differenced phase data indicative of the bearing and horizontal velocity of air movement within the air volume illuminated by the chirps fo the first transmitter.

18. (Currently amended) A SODAR system according to claim 14 [[or 15]] wherein:

said transmitter means comprises a single transmitter,

said receiver means comprises four acoustic receivers arranged in quadrature around and equidistant from the transmitter, said receivers being arranged in two opposed pairs,

each of said receivers outputs to a matched filter adapted to extract phase data in the echoes received by that receiver, <u>and</u>

differencing means connected to said matched filters and adapted to difference phase data extracted therefrom to generate differenced phase data indicative of the bearing and horizontal velocity of air movement within the air volume illuminated by the chirps of the transmitter.

19. (Original) A SODAR system for use in detecting and/or quantifying short-duration near-ground target turbulence in a volume of air, the system comprising:

acoustic transmitter means adapted to direct acoustic chirps into said volume at an acute angle of elevation to generate a first set of chirp echoes from prevailing wind conditions and from target turbulence within said volume and to generate a second set of substantially identical acoustic chirps into the volume to generate a second set of chirp echoes from the prevailing wind conditions in the absence of the target turbulence,

a plurality of acoustic receivers arranged in a row extending from said transmitter means, said receivers being located to receive said first and second series of echoes and to generate an active dataset indicative of said prevailing conditions and turbulence and a reference dataset indicative of the prevailing conditions alone,

means for accepting said active dataset and adapted to transform the same into an active synthetic aperture image of the combined prevailing conditions and turbulence,

means for accepting said reference dataset and adapted to transform the same into a reference synthetic aperture image of the prevailing conditions in the absence of the target turbulence, and

differencing means adapted to difference said active and reference synthetic aperture images to generate a net dataset and a net synthetic aperture image that is representative of the target turbulence without the prevailing wind conditions, or at least with the effect of such prevailing conditions mitigated.